The Tendril

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Design can change lives. It has the power to inspire and heal. I believe that as a designer I have the ability to spread wellness and happiness amongst the community. And through collaboration and design we can improve the way of life for all.

/ THE TENDRIL

This modular vineyard took the traditional understanding of growing and turned it on its side. A site that was once covered completely in grape vines is transformed into a tower-like form to maximize space and growing potential. By performing these practices in a controlled environment every element is carefully manipulated for desirability.


the tendril

SITE LOCATION

5183 Silverado Trail,
Napa Valley, CA **94558**

4 acre Cabernet Franc Vineyard
3,400 square foot residence
2 adjacent 15-acre vineyard lots available

Flinn Vineyard is located in the heart of Napa Valley's Cabernet growing region, in the Oak Knoll District.

The existing vineyard is situated on a west facing slope of the Silverado Trail.

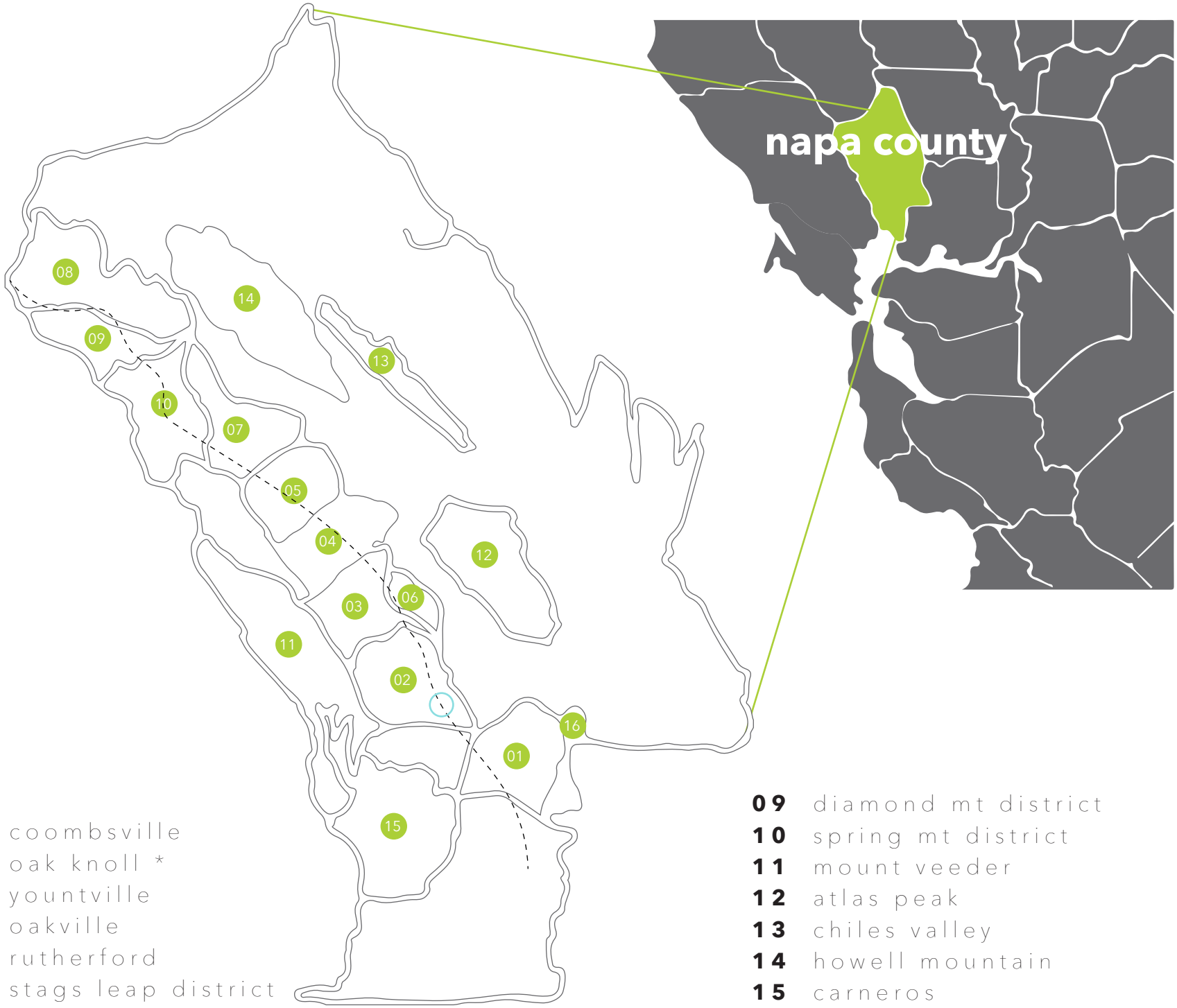
A porous volcanic sub-structure beneath the topsoil provides efficient drainage.

The grapes that are being cultivated are plump, ripe and loaded with varietal flavors.

The combination of vineyard location, soil and vineyard practices yields fully mature fruit with true Cabernet Franc characteristics.

Production is currently very limited.

Winemaker, Gary Wooton, has created a series of award winning Cabernet Franc since 1995.



01 coombsville
02 oak knoll *
03 yountville
04 oakville
05 rutherford
06 stags leap district
07 st. helena
08 calistoga

09 diamond mt district
10 spring mt district
11 mount veeder
12 atlas peak
13 chiles valley
14 howell mountain
15 carneros
16 wild horse valley

– – **Silverado Trail**

CULTURAL CONTEXT

history

Throughout the 19th century wild grapes were present in Napa Valley but were not cultivated until George Calvert Yount first introduced vitis vinifera grapes in 1839. After Mr. Yount, came along several other pioneers such as, John Patchett, Hamiltion Walker Crabb and Charles Krug. Krug is know for the establishment of the first commercial winery in 1861. This led to a winery movement where over 140 wineries were founded including Schramsberg, Beringer, and Inglenook.

In the early 1900's the boom stalled when the valley first became infected br a destructive root louse. More than 80% of the vineyard acreage was affected. Soon after that came the enactment of Prohibition in 1920, where vineyards and wineries were deserted over the next 14 years.

In 1933 when the Prohibition was repealed, Napa Valley's business industries began to recover. At this point there were seven vintners who worked together to revitalize the valley.

NAPA VALLEY STYLE

architectural styles

Architectural Styles in Napa Valley- 3 major styles

European:

Beringer Vineyards, 2000 Main Street, St. Helena
Castello di Amorosa, 4045 North St. Helena Highway, Calistoga
Sterling Vineyards and Winery, 41111 Dunaweal Lane, Calistoga

Classic California Ranch:

Robert Mondavi Winery, 7801 St. Helena Highway, Oakville
Trefethen Family Vineyards, 1160 Oak Knoll Avenue, Napa
Trinchero Family Estates, 277 South St. Helena Highway, St. Helena

Ultra-Modern:

Artesa Vineyards & Winery, 1345 Henry Road, Napa
Hall St. Helena Winery, 401 South St. Helena Highway, St. Helena

Other Styles Include: French Chateaux, Mission-Style Hacienda, Jeffersonian, Parisian, Cape Dutch, Tuscan, Greco-Roman


Ramsgate Winery


AMS

mountain influences

The two mountain ranges of the Napa Valley were created during the formation of the San Andreas fault. The Vaca Range, which forms the valley's eastern boundary, shields us from the scorching heat of the Central Valley while the Mayacamas Mountains separate the west from the cooler, marine influences experienced in neighboring Sonoma County. The hills and knolls on the valley floor are the product of huge mega-slides from the Vaca mountains many years ago and affect weather patterns within those areas.

the napa river

Bisecting the valley is the Napa River, which follows the valley's tapered contour. It begins as little more than a creek at its headwaters and grows into a fully navigable river in its southern stretches. The valley's topography changes with its length, from the windswept estuarine flats and gentle hills in the south to the valley's narrow tip at the town of Calistoga, cradled between the sheer walls of the Palisades at the foot of Mount St. Helena to the east and the forested Mayacamas Mountains to the west.

napa valley watershed

It is defined by Mt. St. Helena to the north, the Mayacamas Mountains to the west, Howell Mountain, Atlas Peak, and Mt. George to the east, and the Napa-Sonoma Marsh to the south. The Napa River runs through the center of the watershed on the valley floor, draining along a 55 mile run from the headwaters of Mt. St. Helena to the San Pablo Bay. The Napa River winds through many types of landscapes: forested mountain slopes, vineyards, urban areas, open pasture, grasslands, industrial zones, and marshes.

The Napa River Watershed is home to most of the residents and developed areas in the county. About 95% or more of the entire population of Napa County live in the Napa River Watershed. Reservoirs in the watershed include Lake Hennessey, Lake Milliken, and Bell Canyon Reservoir. This watershed also provides habitat for many types of plants, fish, and wildlife. Chaparral, brackish and salt water marsh, vernal pools, forests, oak woodlands, grasslands, and riparian habitats can all be found in the watershed.

Source: Napa County Resource Conservation District

DEMOGRAPHICS

POPULATION

napa valley 2013

140,326

GENDER

female **50.2%**

male **49.8%**

61.9 home ownership rate

MEDIAN INCOME

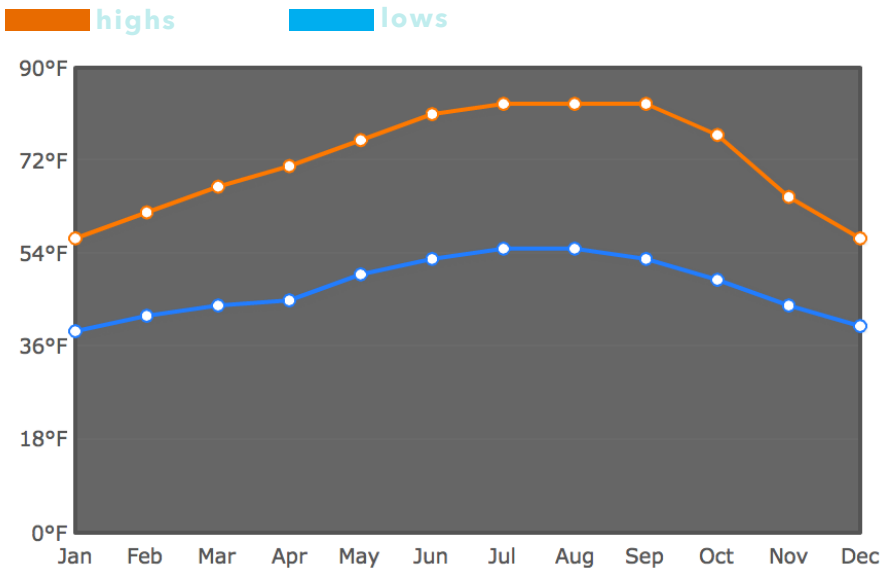
$69,571

HOUSEHOLDS

FORTY NINE THOUSAND TWO HUNDRED AND NINE

AGE

monthly



AVERAGES

monthly

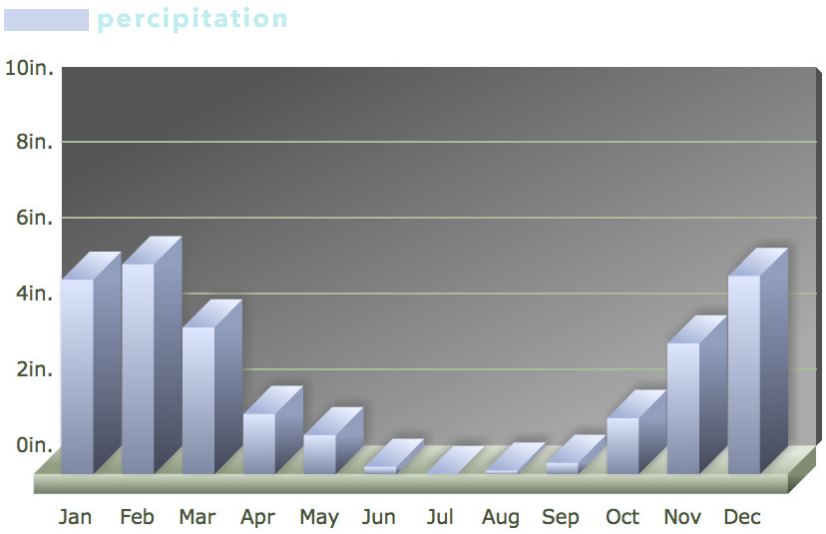
57 - 71

RECORDS

annual

16 - 99

rainfall



SEASONS

warm cold

june / november

PERCIPITATION

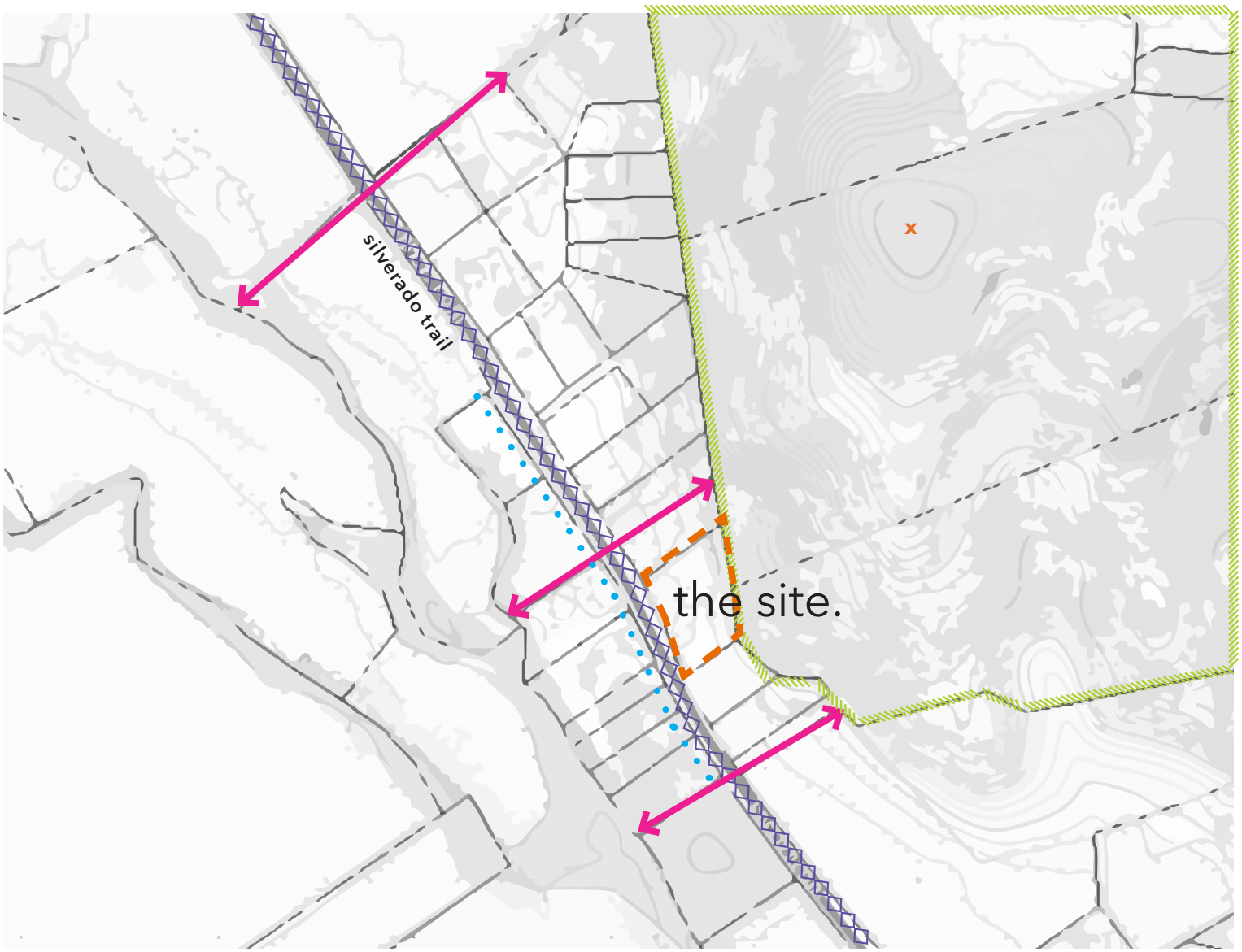
monthly

0.01

circulation + envrionment

parcels
site boundary
minor circulation
major circulation
utility lines
heavy foliage
x highest elevation

scale 1"=1,000' ^n



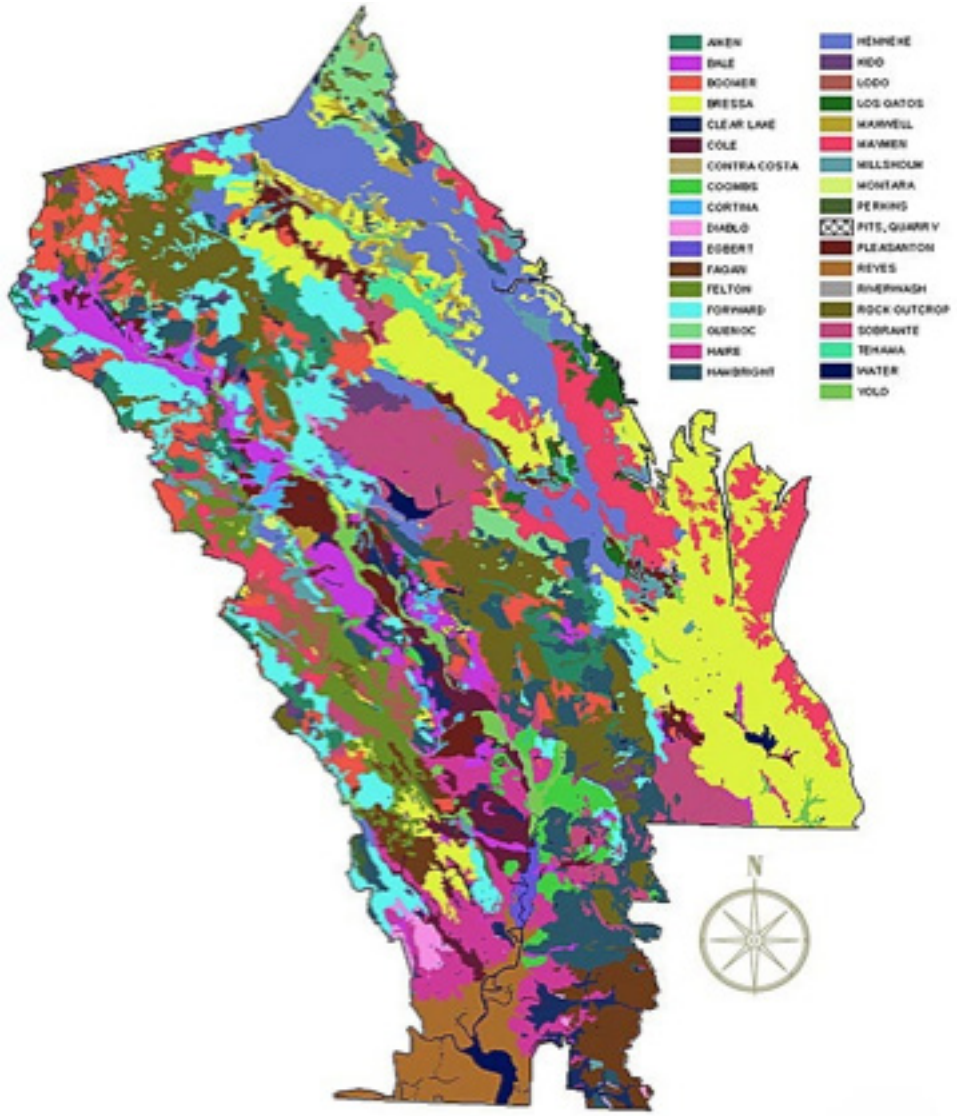
SOIL TEXTURES

- clay
- clay loam
- silty clay loam
- fine sandy loam
- silt loam
- loam
- sandy loam
- unknown
- napa watershed
- napa-sonoma marshes
- napa county
- major streams

scale 1"= 2 mi ^n

SOIL SERIES

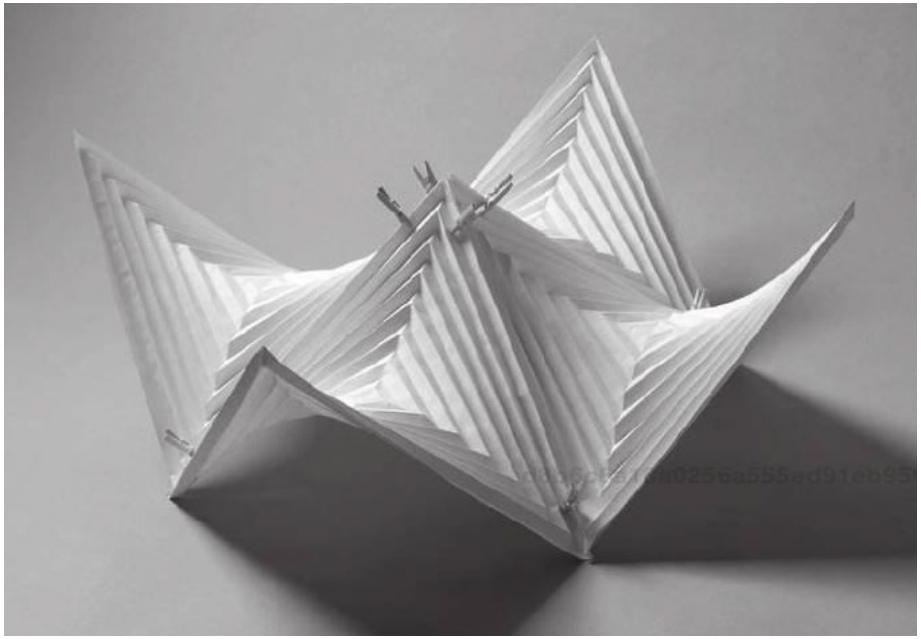
Over 150 million years of seismic events created Napa Valley. Originating from both volcanic and marine soils, tectonic movements eroded to form the valley and compose a unique area of diverse characteristics. =These occurrences resulted in a soil makeup that represents half of the world's soil orders, 33 soil series, and over 100 soil variations.

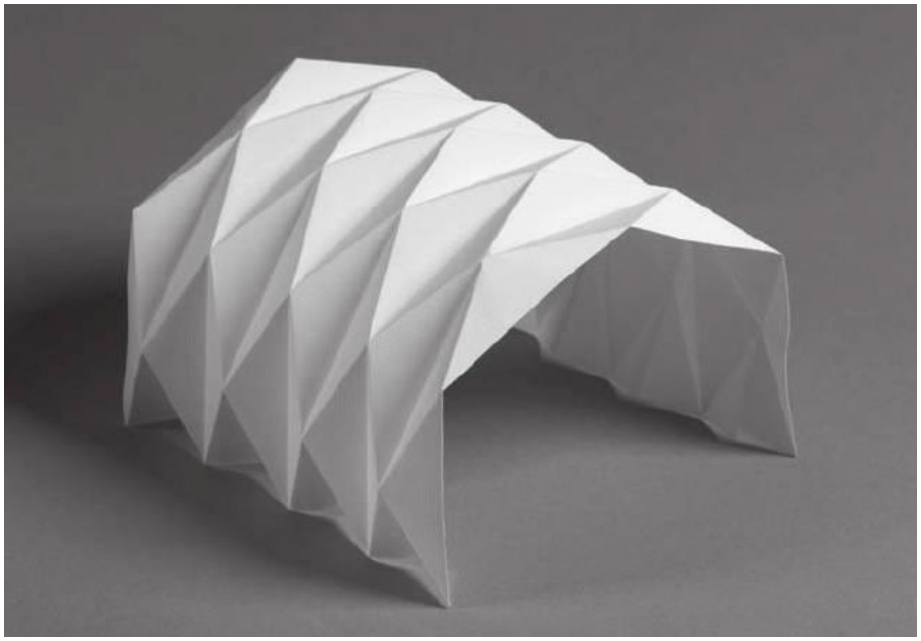


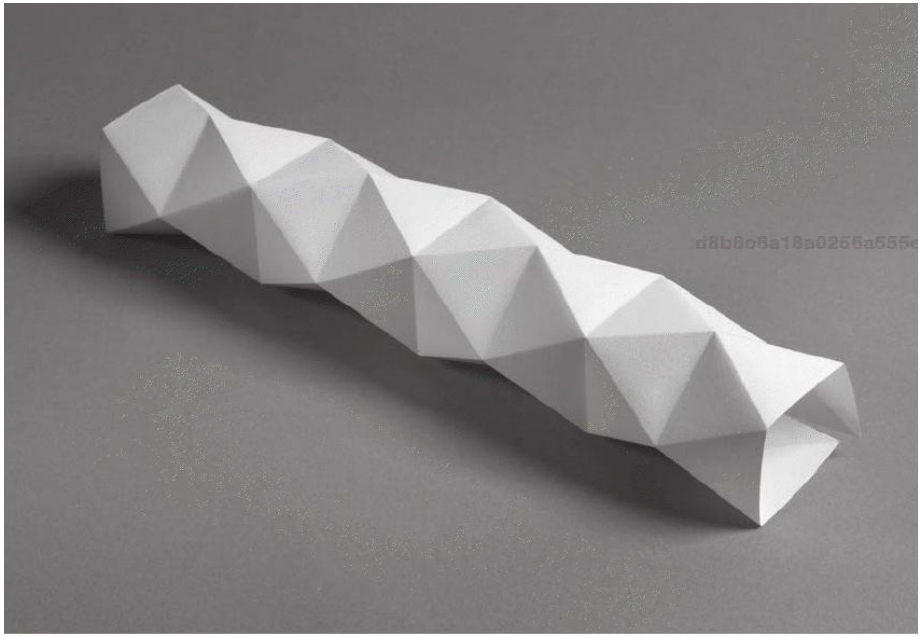
Soil Series Present:
Aiken, Bale, Boomer, Bressa, Clear Lake, Cole, Contracosta, Coombs, Cortina, Diaelo, Egbert, Fagan, Felton, Forwards, Guenoc, Haire, Hambright, Henneke, Kidd, Lodo, Los Gatos, Maxwell, Maymen, Millsholm, Montara, Perkins, Pits, Quarry, Pleasanton, Reyes, Rivverwash, Rockoutcrop, Sobrante, Teehama, Water, Volo

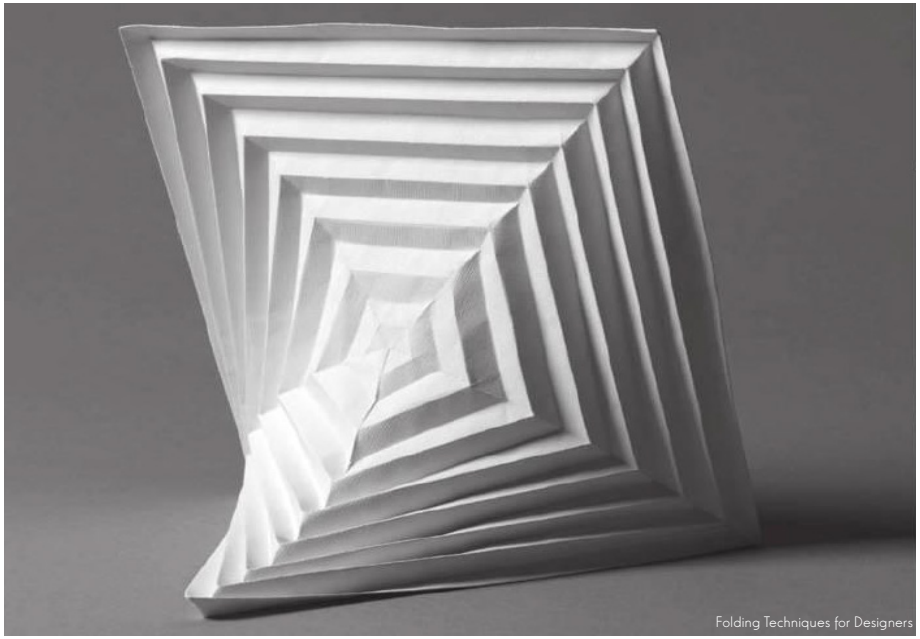
/ FORM STUDY

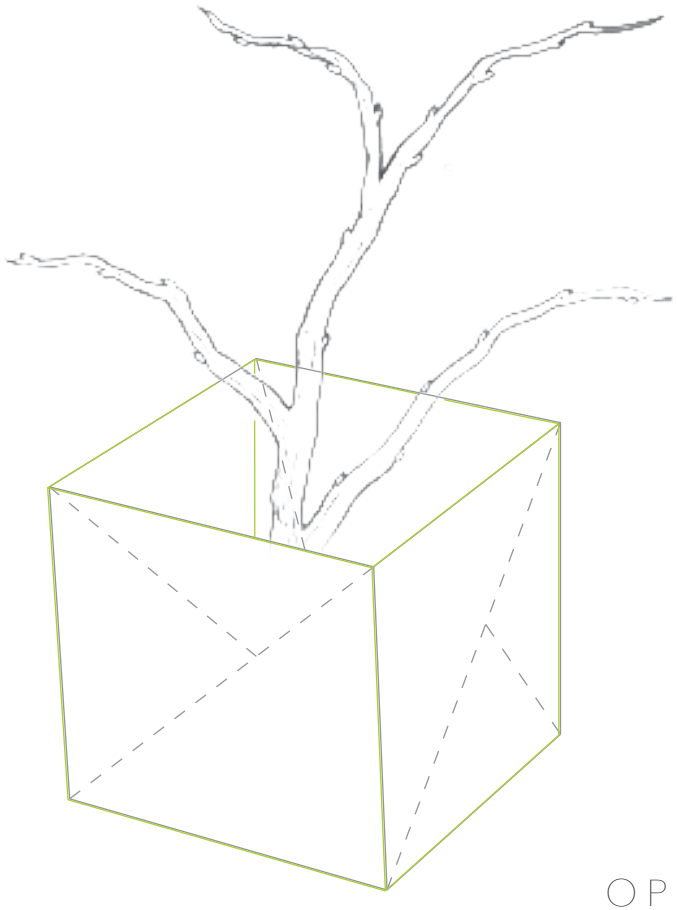
The modules were initially designed and inspired by the ancient Japanese art of paper folding, Origami. The shape chosen takes after the box spiral fold that provides ultimate support and balance. The flat edges allow modularity and simplicity. The basic four sided form is ideal for 3 dimensional growth as it shifts vertically and horizontally, ideal for site specific modifications.



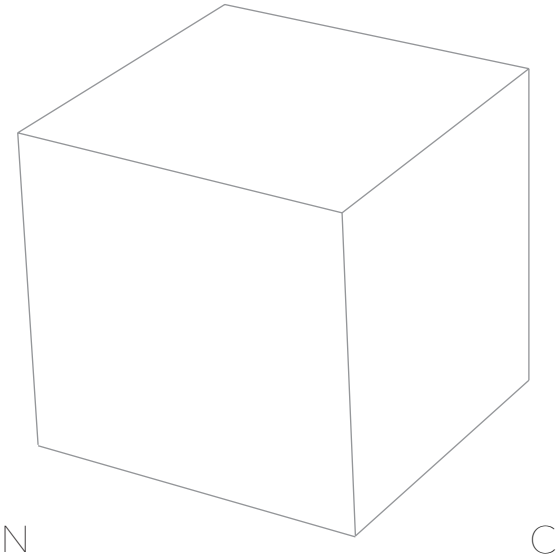


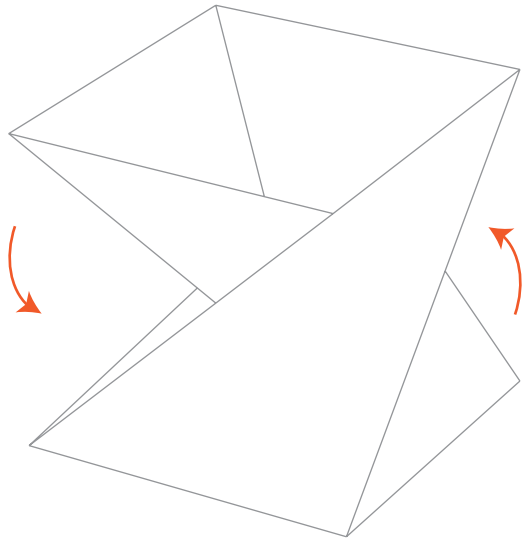




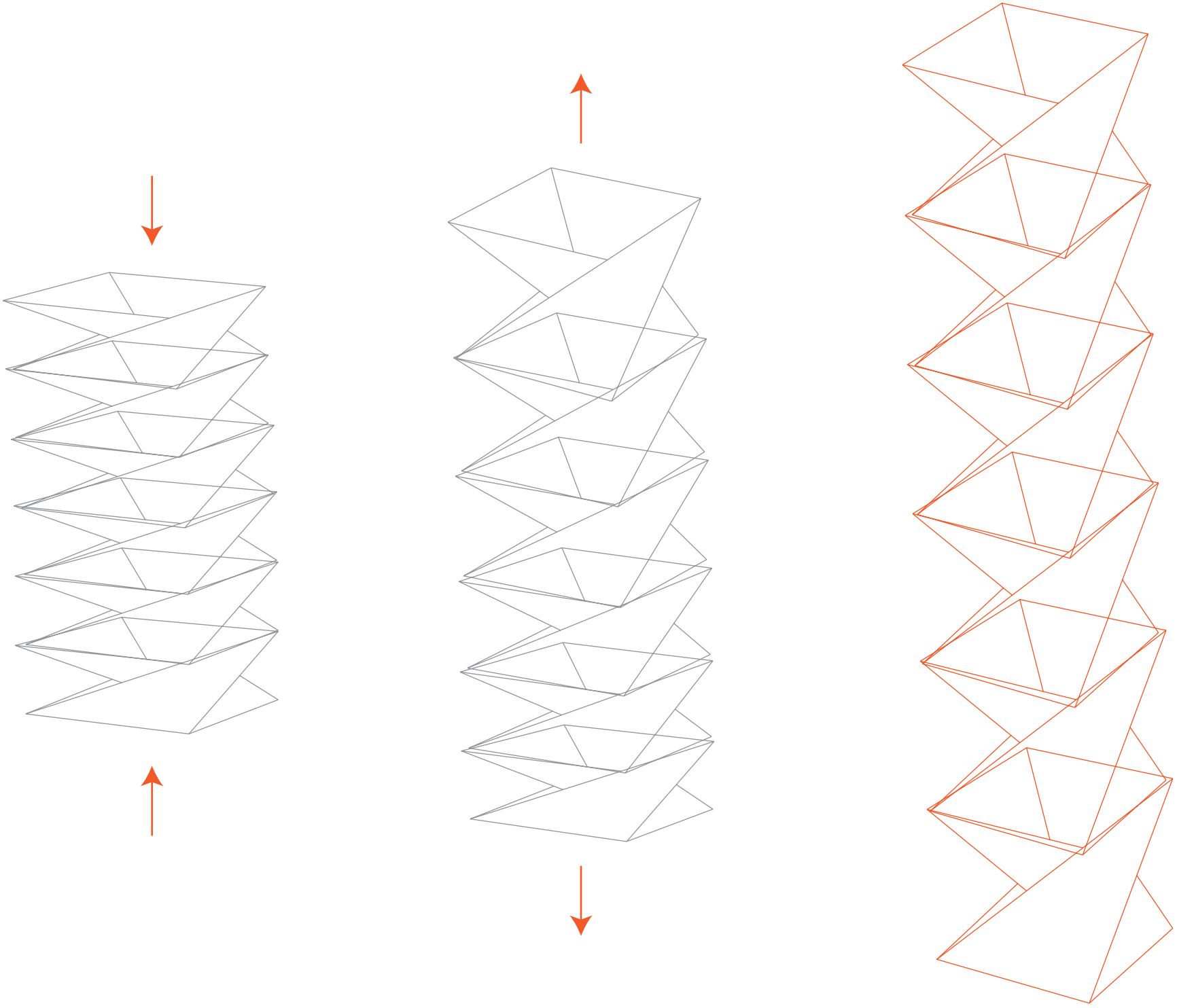


OPEN



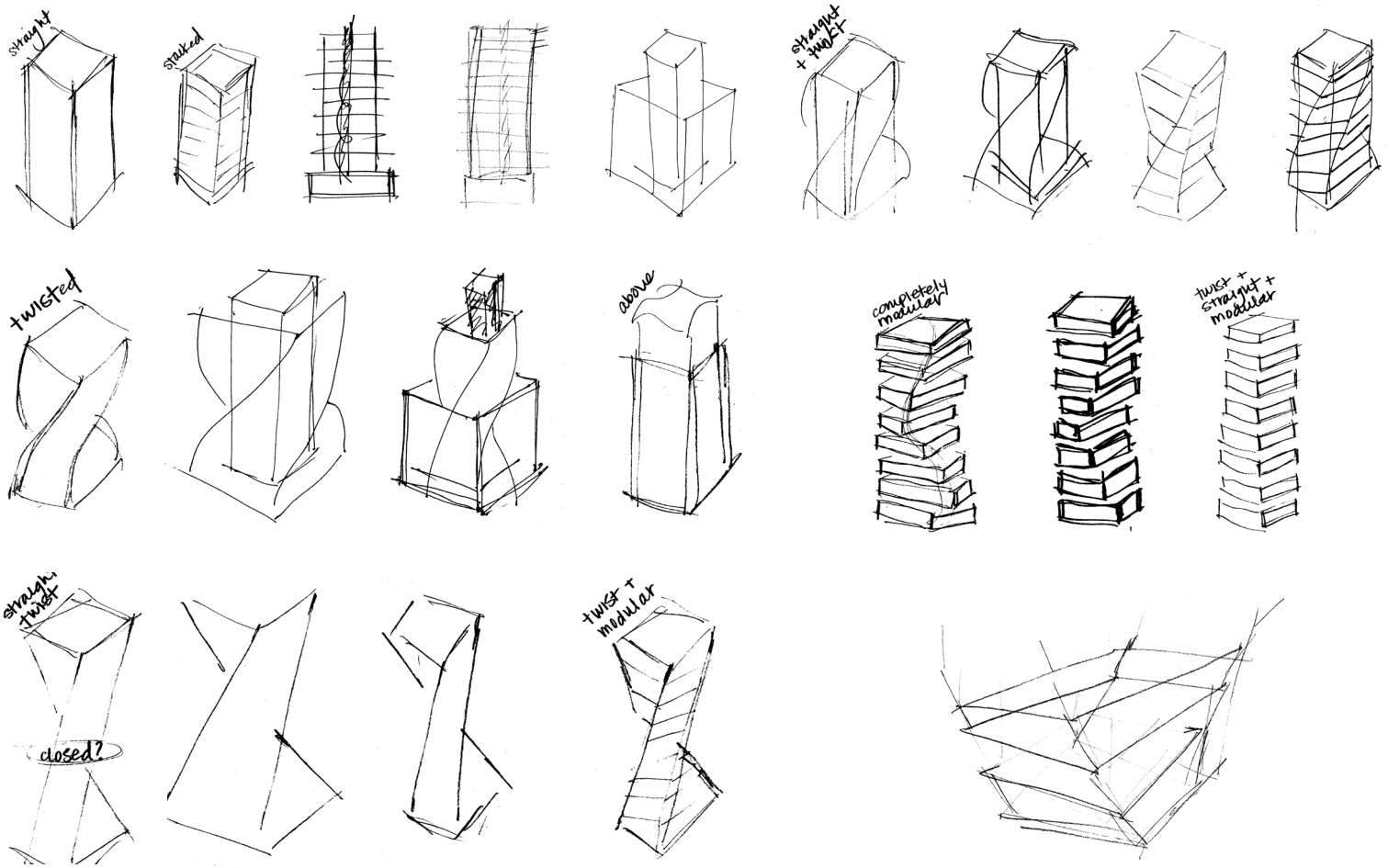


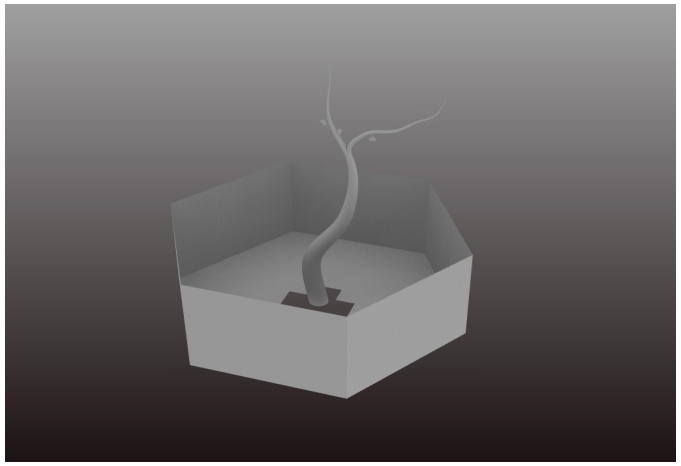
CLOSED

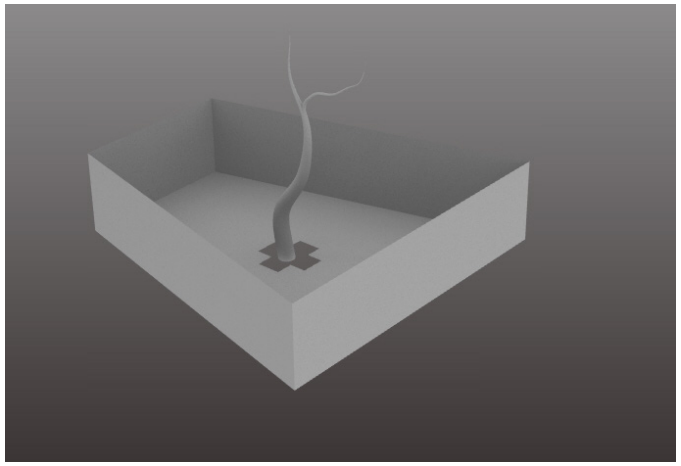


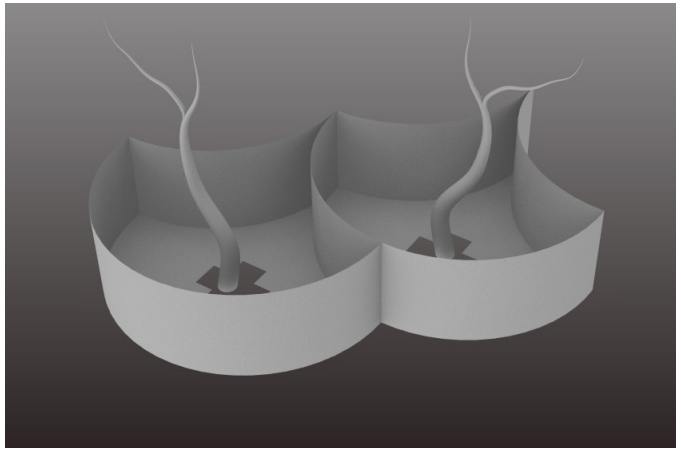
/ CONCEPT MODULES

This stage of the design process was full of experimentation, where the modules varied in scale. At the smallest, they would enclose one vine specifically and cater to the individual needs of that plant. However, as time went on I discovered it to be much more productive to group the vines as species and create an environment ideal for a quarter acre of each varietal.


straight
slanted
straight + twist
twisted
above
completely modular
twist + straight + modular
straight twist
closed?
twist + modular

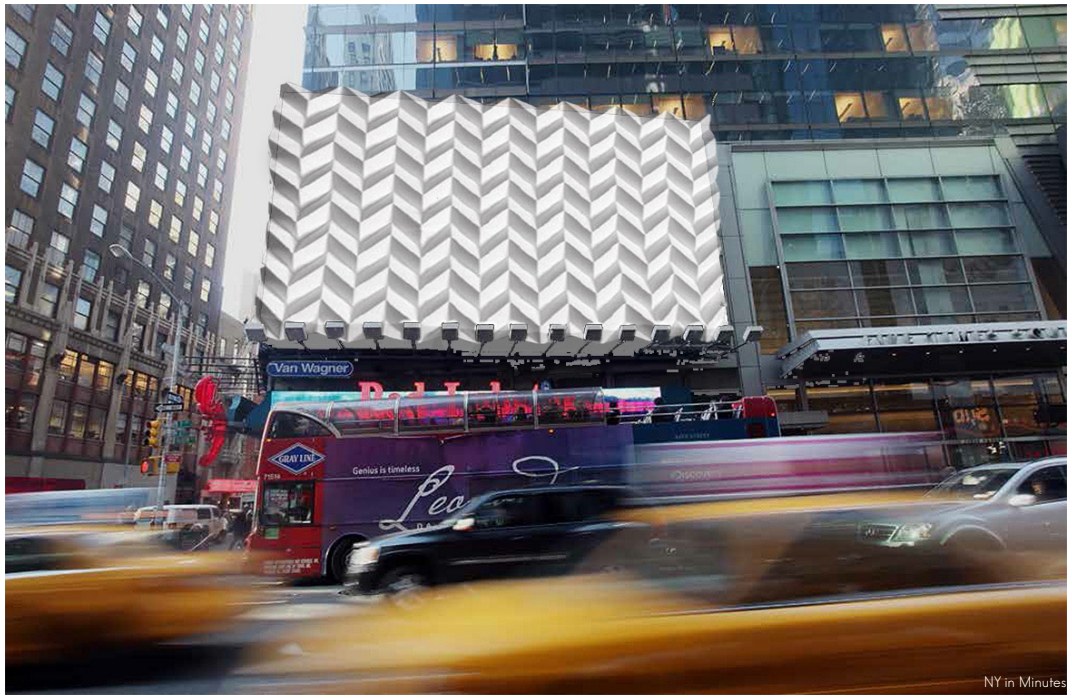







Architectural Digest


Google Earth


Van Wagner
GRAY LINE
Genius is timeless
NY in Minutes


SNT Times

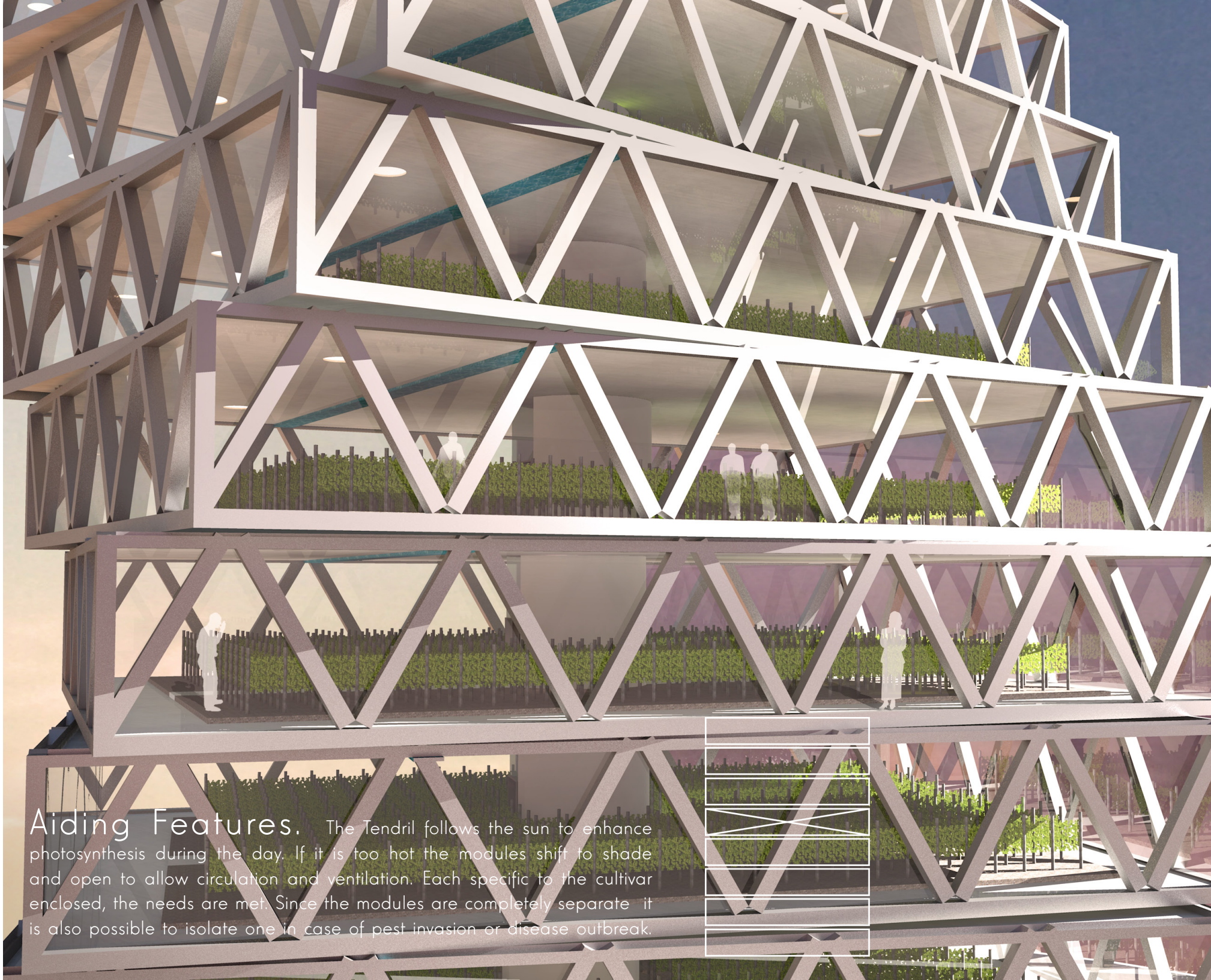
/ THE SOLUTION

This modular vineyard took the traditional understanding of growing and turned it on its side. A site that was once covered completely in grape vines is transformed into a tower-like form to maximize space and growing potential. By performing these practices in a controlled environment every element is carefully manipulated for desirability.

Any wine. First things first. Wine making is all about the grape. If you have the right environment for the right grape, the wine can be made delicious. The tough part is finding that perfect plot of land that is large enough, affordable and ultimately suitable for the varietal you want to grow. But what if there was a way to CREATE that ideal environment? And what if that perfect environment could be adjusted for each different type of grape?

Any time. It does not stop at manipulating conditions specific to the grape, but also controlling when they are harvested. With humidity, temperature, irrigation, soils, and sunlight all being calculated, you can sustain growth almost all year round, and maybe even harvest two times in one year. While still allowing time for the vines to rest, special pink LED lights can account for any lost time that comes from a lack of sun.

Any where. Location is crucial in traditional vineyard practices. Certain cultivars will thrive in areas and not in others. This is why there are well known wine regions across the world. The idea here is that in under an acre of undefined land, you can perfectly harvest eleven varieties of grapes. All that would normally require different counties or even countries to be successful. With this control, the Tendril can be implemented almost anywhere.



Aiding Features. The Tendril follows the sun to enhance photosynthesis during the day. If it is too hot the modules shift to shade and open to allow circulation and ventilation. Each specific to the cultivar enclosed, the needs are met. Since the modules are completely separate it is also possible to isolate one in case of pest invasion or disease outbreak.

MATERIALS

solar paneled roof

multi-zone climate control,
temperature + humidity

retractable window frame
for circulation

tempered glass for
sun penetration

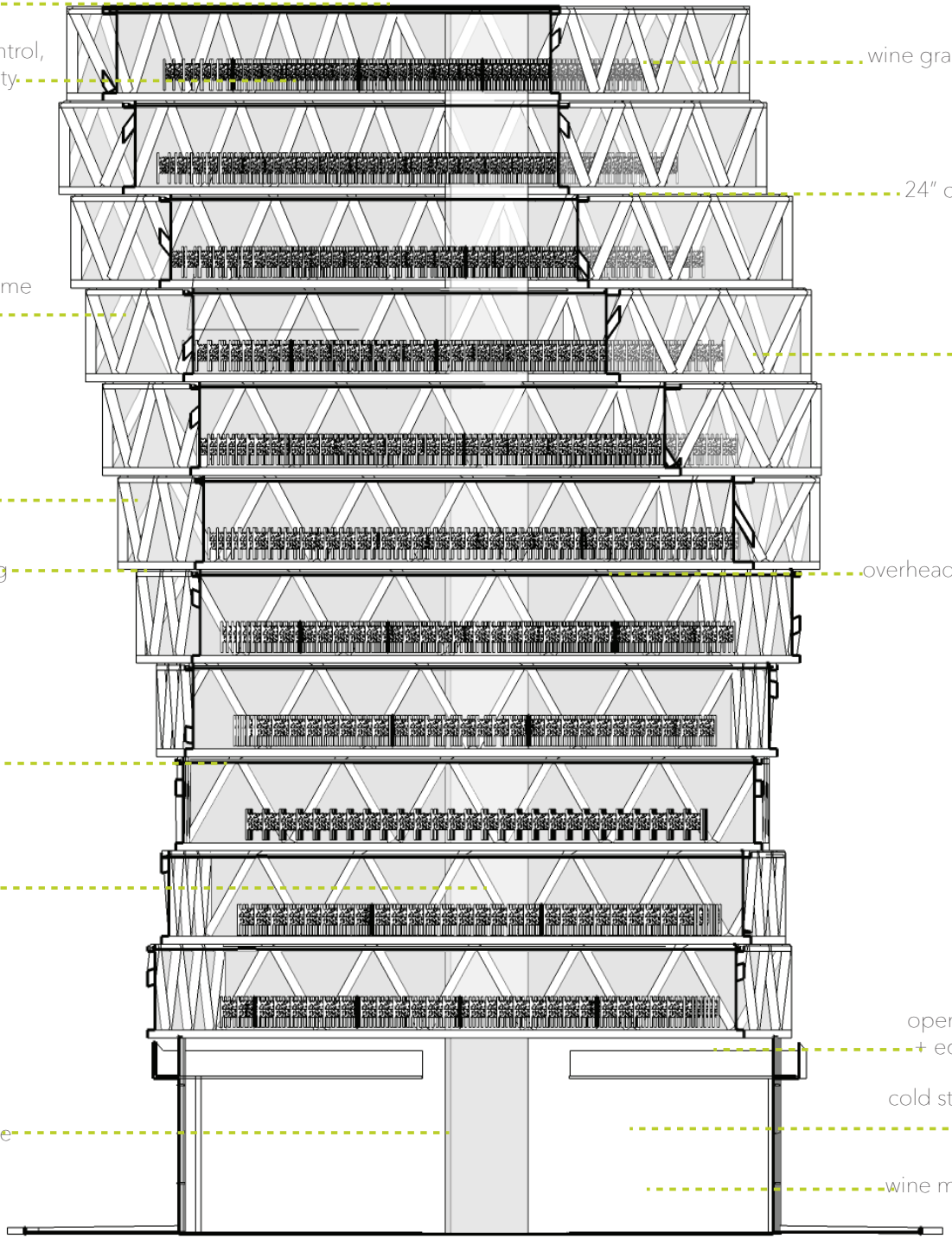
brushed metal framing

SYSTEMS

artificial LED light
red + blue

central transport lift

closed water system,
no herbicide/ pesticide



VINEYARD NEEDS

wine grape variety, 1-11

24" custom soil pad

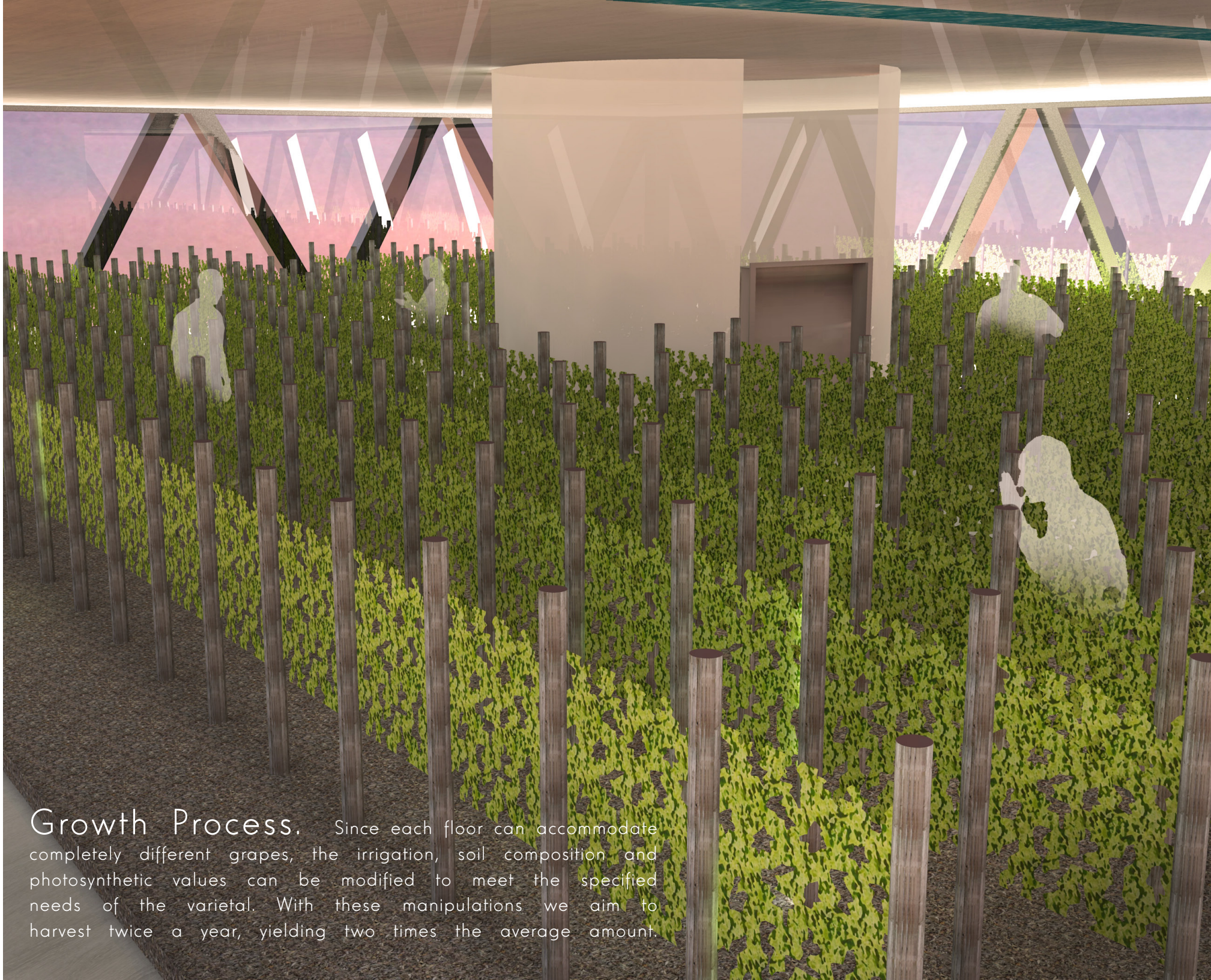
maintenance

overhead irrigation track

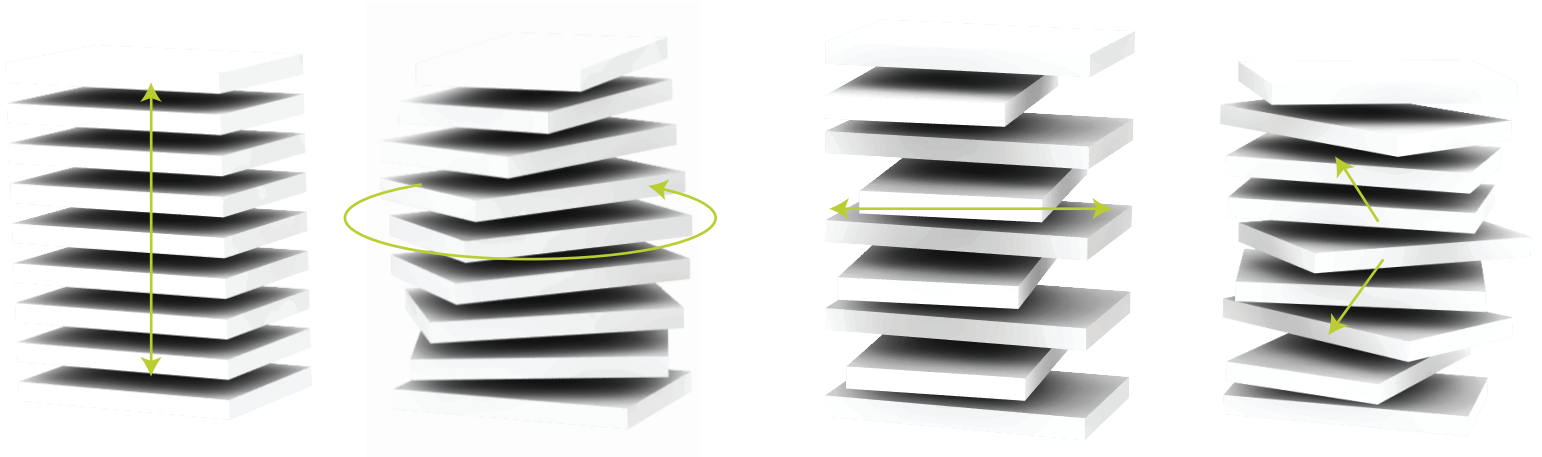
open conditioning
+ equipment area

cold storage area for
planting

wine making services

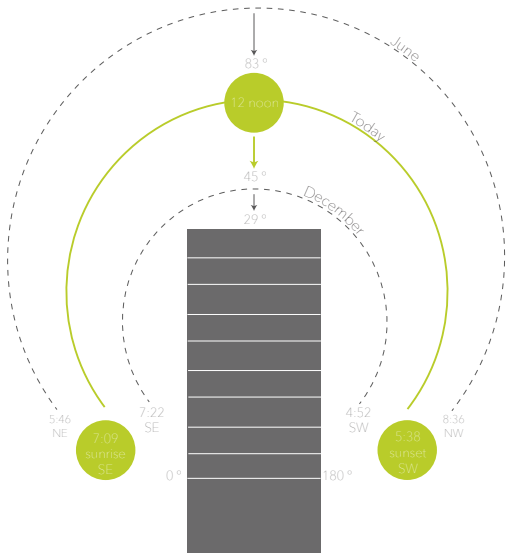


Growth Process. Since each floor can accommodate completely different grapes, the irrigation, soil composition and photosynthetic values can be modified to meet the specified needs of the varietal. With these manipulations we aim to harvest twice a year, yielding two times the average amount.



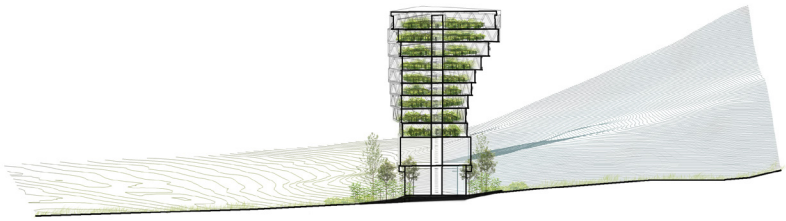
Module Rotation.

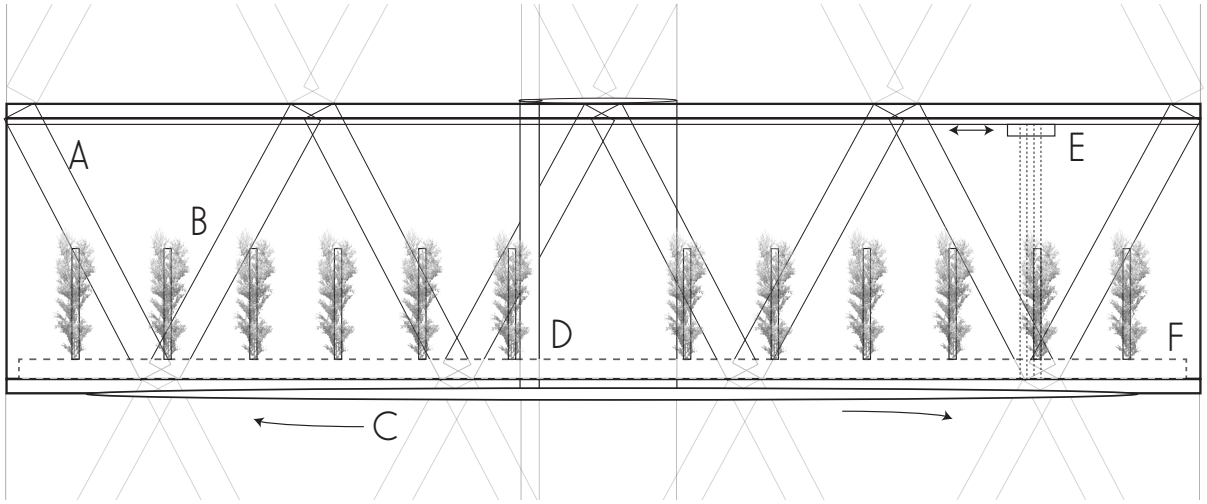
To completely capture the sunlight, or shade, each motor of each modules is calculated to connect the time and date with the type of grape growing inside. For example, Chardonnay grapes naturally contain more sugar than Pinot Noir. Therefore they require less sunlight to reach maximum sugar percentages, and require less exposure.



Sun Response.

The tempered glass modules rotate to respond to the changing direction of sunlight based on time of day and seasonality.





Module Section.

A) non absorbent insulation, metal framing

B) 6 x 4 vine spacing

C) 360 degree track for full module rotation

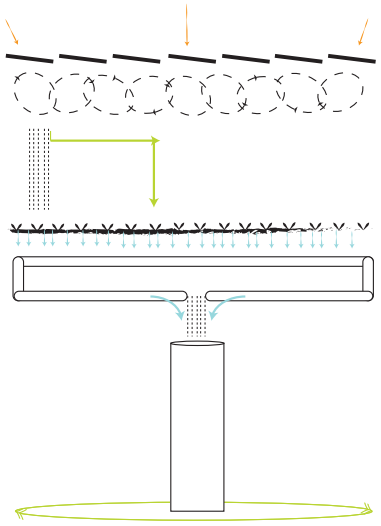
D) vertical core for transport and water circulation

E) horizontal overhead irrigation

F) 8 inch compacted soil, specific to grape variation

Saving Energy.

On any vineyard, a large portion of funds go simply toward electricity and water. The Tendril has found a way to use technology and sustainable resources to produce high quality grapes in half the time, with substantially less energy costs. Solar panels can account for most of the buildings power needed to turn the modules and move the irrigation.



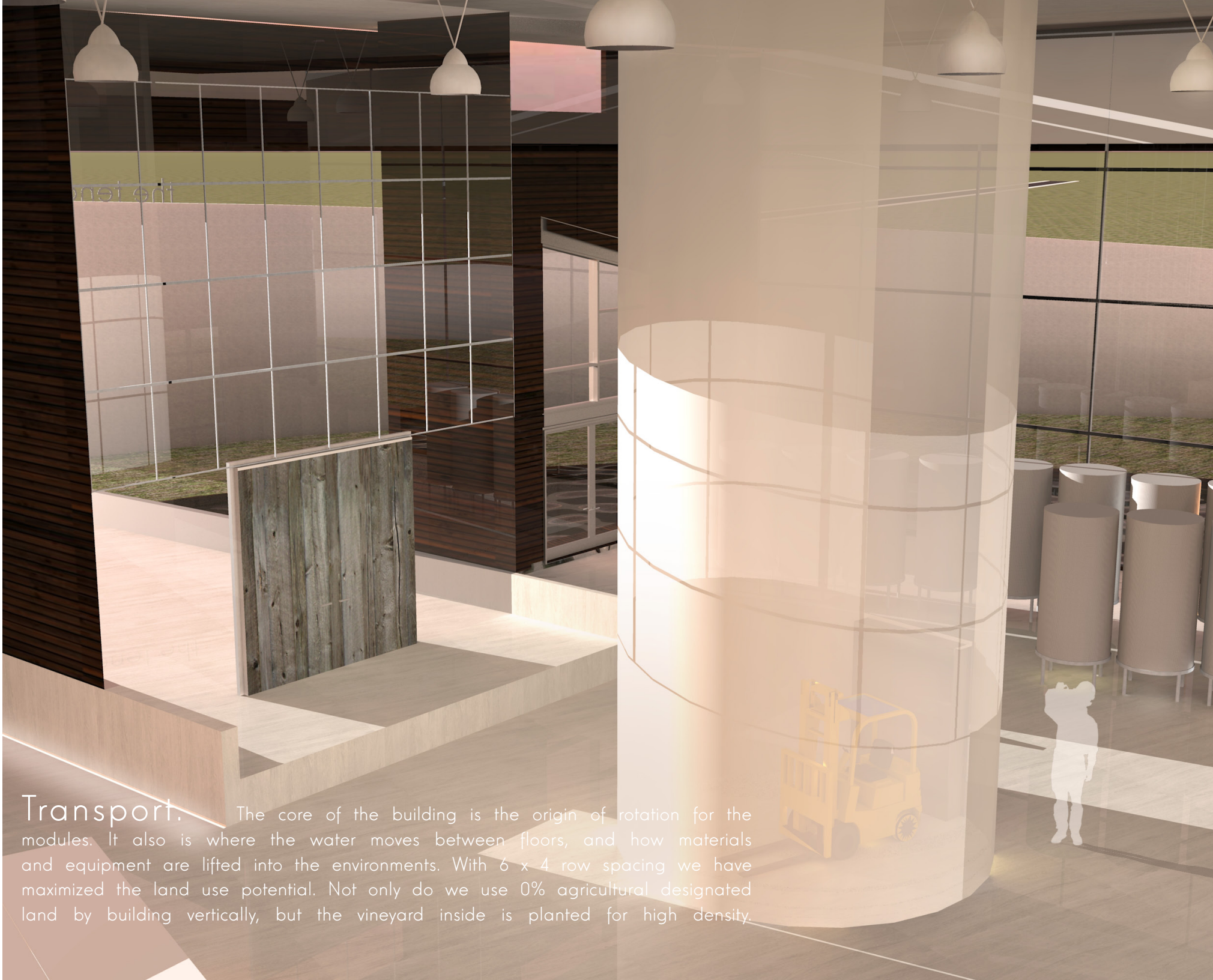
solar power

air circulation

irrigation track
specific soil composition
water filtration

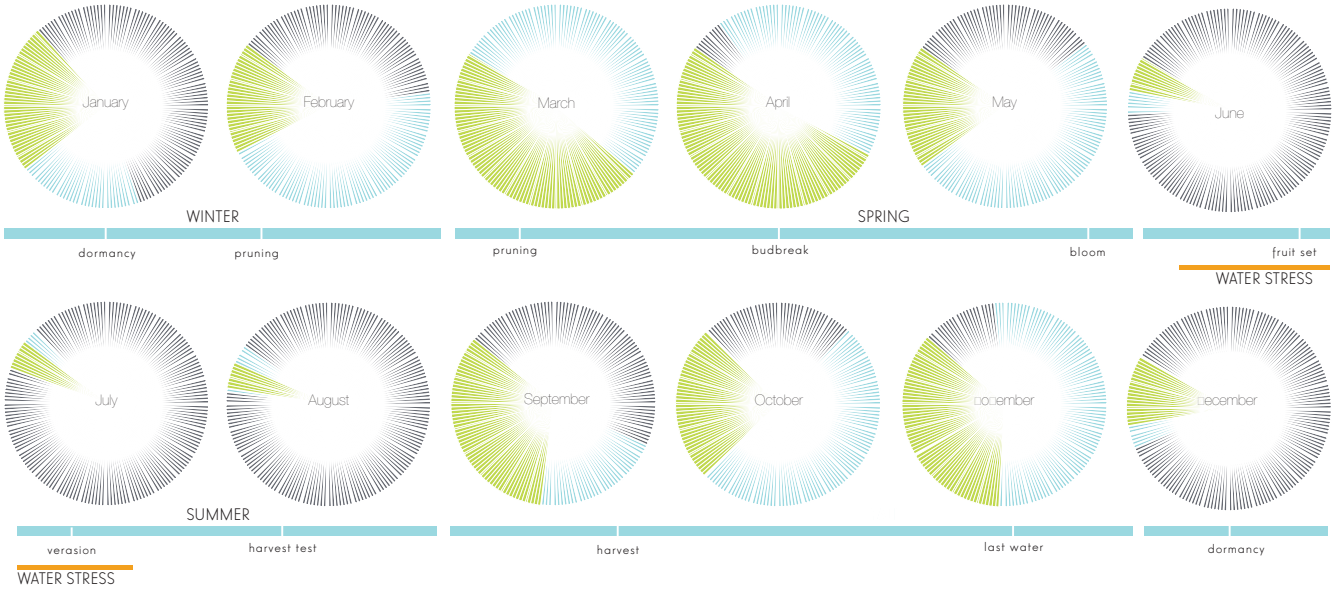
vertical water transport

module rotation track



Transport.

The core of the building is the origin of rotation for the modules. It also is where the water moves between floors, and how materials and equipment are lifted into the environments. With 6 x 4 row spacing we have maximized the land use potential. Not only do we use 0% agricultural designated land by building vertically, but the vineyard inside is planted for high density.



Saving Water.

The most common type of vineyard irrigation in the US is drip irrigation. Used in 70% of the California's 570,000 acres of wine grapes. Estimating to about 100-200 gallons of water needed per season. Which equals about 6 gallons of water for each 1 gallon of wine. In 2013, only one quarter (125,000 acres) of the state's wine acreage participated in the Code of Sustainable Wine Growing Practices program.

With the Tendril we can eliminate evaporation from heat and water used for frost prevention, just by climate control. It is also able to recycle 15 % of the water used for irrigation by catching the unused water beneath each soil pad and recirculating it through the filtration track.

More People.

In 2015 we reached 7 billion humans on Earth, USA being the 3rd largest country behind China and India. With a demanding population, open agricultural land is rapidly disappearing and the need for food and drink is increasing. By turning vineyards vertical, we are able to continue growing grapes and make room for other necessary resources.

Less Space.

Every day now, the threats of global warming increase. Humans are responsible for a majority of things, ranging from transportation to deforestation. A few of these issues have been addressed in the Tendril, including the usage of solar energy, 0% agricultural land usage, and recycling water for irrigation.